

Integrated Solar Array and Reflectarray Antenna (ISARA)

Completed Technology Project (2012 - 2018)



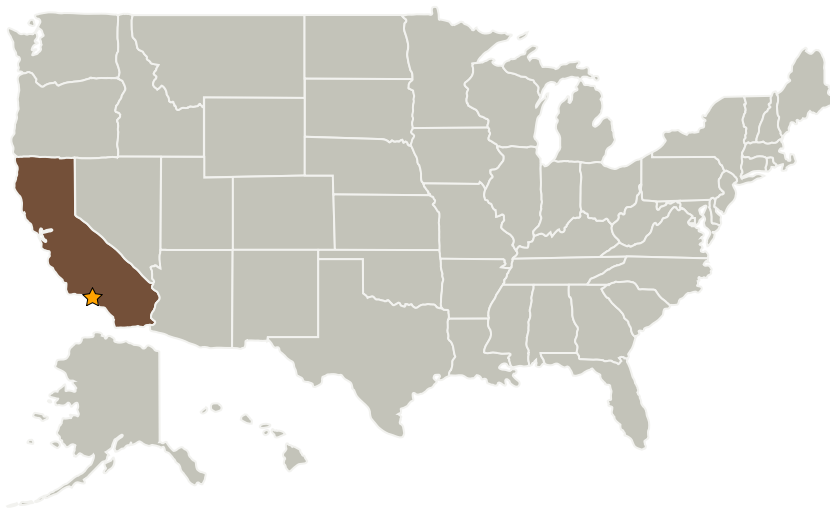
Project Introduction

The ISARA mission will demonstrate a Ka-band reflectarray antenna that will increase downlink data rates for small spacecraft from the typical existing rates of about 10 kilobits per second (kbps) to approximately 100 megabits per second (Mbps). This technology maintains compatibility with existing ground stations and is extensible to antennas for radar systems. For the demonstration mission, the reflectarray antenna has been integrated onto the back side of a commercial deployable solar array that is easily stowed along the body of the 3U CubeSat.

Anticipated Benefits

The radio communication technology flown on ISARA has the potential to greatly increase the data downlink capability for CubeSats to up to 100 Mb/s while maintaining compatibility with legacy ground stations. This will extend the capability of CubeSats and further enable their use for CubeSats high value data-intensive science missions. Additionally the antenna technology is directly applicable to radar instruments and could enable new remote sensing capabilities within the CubeSat form factor.

Primary U.S. Work Locations and Key Partners



Integrated Solar Array and
Reflectarray Antenna

Table of Contents

Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Links	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Project Website:	3
Technology Areas	3
Target Destinations	3

Integrated Solar Array and Reflectarray Antenna (ISARA)

Completed Technology Project (2012 - 2018)



Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory (JPL)	Lead Organization	NASA Center	Pasadena, California
Pumpkin Inc.	Supporting Organization	Industry	
The Aerospace Corporation	Supporting Organization	Industry	El Segundo, California

Primary U.S. Work Locations

California

Project Transitions

**October 2012:** Project Start**April 2018:** Closed out

Closeout Summary: The ISARA mission has successfully demonstrated a high bandwidth Ka-band CubeSat communications capability that is applicable to commercial and government systems. For a modest increase in mass, volume and cost, this technology increases downlink data rates from a baseline of 9.6 kbps for existing UHF systems to over 100 Mbps, a 105 fold increase in data capacity. This technology is being used on the MarCO CubeSats that are currently on-course to Mars to relay data in real time from the InSight lander during its descent to the Martian surface.

Closeout Link: https://www.nasa.gov/directorates/spacetech/small_spacecraft/isara_project.html

Links

ISARA Project Page

(https://www.nasa.gov/directorates/spacetech/small_spacecraft/isara_project.html)

JPL ISARA Project Page

(<https://www.jpl.nasa.gov/missions/integrated-solar-array-and-reflectarray-antenna-isara/>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Spacecraft Technology

Project Management

Program Director:

Christopher E Baker

Program Manager:

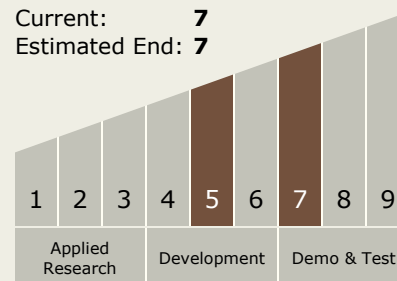
Roger Hunter

Principal Investigator:

Dorothy K Lewis

Technology Maturity (TRL)

Start: **5**
 Current: **7**
 Estimated End: **7**



Integrated Solar Array and Reflectarray Antenna (ISARA)

Completed Technology Project (2012 - 2018)



Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.2 Radio Frequency
 - └ TX05.2.6 Innovative Antennas

Target Destinations

Earth, The Moon, Mars